

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *durations* of effective sunshine whence the durations relative to possible sunshine are derived; the observers' personal estimates give the percentage of *area* of clear sky. These numbers have no necessary relation to each other, since stationary banks of clouds may obscure the sun without covering the sky, but when all clouds have a steady motion past the sun and are uniformly scattered over the sky, the percentages of duration and of area agree closely. For the sake of comparison, these percentages have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental records of percentages of durations of sunshine are almost always larger than the observers' personal estimates of percentages of area of clear sky; the average excess for September, 1897, is 8 per cent for photographic and 7 per cent for thermometric records.

The details are shown in the accompanying table, in which the stations are arranged according to the *total possible* duration of sunshine, and not according to the *observed* duration. In obtaining the total possible sunshine the value for the parallel of latitude nearest the station is used.

Difference between instrumental and personal observations of sunshine.

Stations.	Latitude.	Apparatus.	For whole month.		Instrumental record of sunshine.			
			Total possible.	Personal.	Photographic.	Difference.	Thermometric.	Difference.
Key West, Fla.....	24 34	T	369.0	83	72	+11	50	+26
Tampa, Fla.....	27 57	T	369.6	46	72	+6	48	+22
Galveston, Tex.....	29 18	P	370.4	72	78	+6	57	+1
New Orleans, La.....	29 58	T	370.8	51	55	+4	77	+4
Savannah, Ga.....	32 05	P	371.4	51	55	+4	77	+4
Vicksburg, Miss.....	32 23	T	371.4	51	55	+4	77	+4
San Diego, Cal.....	32 43	P	371.4	51	55	+4	77	+4
Charleston, S. C.....	32 47	T	371.4	51	55	+4	77	+4
Phoenix, Ariz.....	33 29	P	371.4	51	55	+4	77	+4
Atlanta, Ga.....	33 45	T	371.8	61	82	+16	65	+4
Los Angeles, Cal.....	34 03	P	371.8	65	78	+13	91	+17
Wilmington, N. C.*.....	34 14	T	372.0	74	.....	.....	.....	.....
Little Rock, Ark.....	34 45	T	372.0	74	.....	.....	91	+17

Difference between instrumental and personal observations.—Cont'd.

Stations.	Latitude.	Apparatus.	For whole month.		Instrumental record of sunshine.			
			Total possible.	Personal.	Photographic.	Difference.	Thermometric.	Difference.
Chattanooga, Tenn.....	35 04	T	372.0	66	68	+2	76	+10
Santa Fe, N. Mex.....	35 41	P	372.2	49	63	+14	83	+14
Raleigh, N. C.....	35 45	T	372.2	69	.....	.....	83	+14
Nashville, Tenn.....	36 10	T	372.2	86	.....	.....	91	+5
Fresno, Cal.....	36 43	T	372.6	85	.....	.....	91	+6
Dodge City, Kans.....	37 43	P	373.0	73	86	+13	.....	.....
San Francisco, Cal.....	37 48	T	373.0	63	.....	.....	71	+8
Louisville, Ky.....	38 15	T	373.0	84	.....	.....	93	+9
St. Louis, Mo.....	38 38	T	373.4	86	.....	.....	90	+4
Washington, D. C.....	38 54	P	373.4	73	79	+6	.....	.....
Kansas City, Mo.....	39 05	P	373.4	80	84	+4	.....	.....
Cincinnati, Ohio.....	39 06	T	373.4	80	.....	.....	82	+2
Parkersburg, W. Va.....	39 16	T	373.4	77	.....	.....	86	+9
Baltimore, Md.....	39 18	T	373.4	77	.....	.....	74	-3
Atlantic City, N. J.....	39 25	P	373.4	67	80	+13	.....	.....
Denver, Colo.....	39 45	P	373.6	47	60	+22	.....	.....
Indianapolis, Ind.....	39 46	T	373.6	83	.....	.....	91	+9
Philadelphia, Pa.....	39 57	T	373.6	62	.....	.....	77	+15
Columbus, Ohio.....	39 58	T	373.6	76	.....	.....	90	+14
Harrisburg, Pa.....	40 16	T	373.6	70	.....	.....	82	+12
Pittsburg, Pa.....	40 22	T	374.0	84	.....	.....	51	-7
New York, N. Y.....	40 43	T	374.0	67	.....	.....	70	+3
Salt Lake City, Utah.....	40 46	P	.....	55	.....	.....	.....	.....
Eureka, Cal.....	40 48	P	374.0	50	48	-2	.....	.....
Cheyenne, Wyo.....	41 08	P	.....	58	.....	.....	.....	.....
Omaha, Nebr.....	41 16	P	374.0	79	87	+8	.....	.....
Cleveland, Ohio.....	41 30	T	374.5	64	.....	.....	73	+9
Des Moines, Iowa.....	41 35	T	374.5	80	.....	.....	83	+3
Chicago, Ill.....	41 53	T	374.5	71	.....	.....	71	0
Erie, Pa.....	42 07	T	374.5	59	.....	.....	72	+13
Binghamton, N. Y.....	42 08	T	374.5	61	.....	.....	67	+6
Detroit, Mich.....	42 20	T	374.5	69	.....	.....	75	+6
Boston, Mass.....	42 31	T	374.5	60	.....	.....	69	+9
Dubuque, Iowa.....	42 30	T	.....	.....	.....	.....	.....	.....
Albany, N. Y.....	42 39	T	375.0	60	.....	.....	79	+19
Buffalo, N. Y.....	42 53	T	375.0	56	.....	.....	67	+11
Rochester, N. Y.....	43 08	T	375.0	52	.....	.....	54	+2
Idaho Falls, Idaho.....	43 29	T	375.0	60	.....	.....	62	+2
Portland, Me.....	43 39	T	375.4	58	.....	.....	75	+17
Northfield, Vt.....	44 10	P	375.4	47	54	+7	.....	.....
Eastport, Me.....	44 54	P	375.8	33	54	+21	.....	.....
St. Paul, Minn.....	44 58	P	375.8	60	71	+11	.....	.....
Minneapolis, Minn.....	44 59	T	375.8	.....	.....	.....	64	.....
Portland, Oreg.....	45 32	T	376.1	51	.....	.....	45	-6
Helena, Mont.....	46 34	P	376.9	51	43	-8	.....	.....
Bismarck, N. Dak.....	46 47	P	376.9	73	78	+5	.....	.....
Seattle, Wash.....	47 38	T	377.5	44	.....	.....	40	-4
Spokane, Wash.....	47 40	P	377.5	50	.....	.....	56	+6

* Instrument out of order.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Snowfall and rainfall are expressed in inches.

Alabama.—The mean temperature was 75.6°, or 0.7° above normal; the highest was 102°, at Goodwater and Jasper on the 17th, and the lowest, 33°, at Hamilton on the 21st. The average precipitation was 0.55, or 2.15 below normal; the greatest monthly amount, 2.12, occurred at Mobile, while no rain fell at several stations.—*F. P. Chaffee.*

Arizona.—The mean temperature was 75.8°, or 2.2° above normal; the highest was 110°, at Maricopa, Parker, and Texas Hill on the 21st, 22d, 23d, and 24th, and the lowest, 37°, at Williams on the 16th. The average precipitation was 2.40, or 1.20 above normal; the greatest monthly amount, 7.10, occurred at Natural Bridge; no rain fell at San Simon.—*W. T. Blythe.*

Arkansas.—The mean temperature was 76.7°, or 3.8° above normal; the highest was 108°, at Keesees Ferry on the 3d, and the lowest, 33°, at Witts Springs on the 19th and at Newport on the 22d. The average precipitation was 0.60, or 2.46 below normal; the greatest monthly amount, 2.87, occurred at Fort Smith; no rain fell at several stations in the eastern portion of the State. The month was the driest September on record.—*F. H. Clarke.*

California.—The mean temperature was 67.7°, or 2.1° below normal; the highest was 117°, at Salton on the 24th, and the lowest, 10°, at Sneddens Ranch, Ventura County, on the 12th. The average precipitation was 0.33, or 0.11 above normal; the greatest monthly amount, 2.50, occurred at Crescent City Lighthouse; no rain fell in the upper San Joaquin Valley and in portions of southern California.—*W. H. Hummon.*

Colorado.—The mean temperature was 61.1°, or 3.7° above normal; the highest was 101°, at Las Animas and Wray on the 1st, and the lowest, 22°, at Millbrook on the 28th. The average precipitation was 1.31, or 0.27 above normal; the greatest monthly amount, 5.80, occurred at Rico, and the least, trace, at Yuma.—*F. H. Brandenburg.*

Florida.—The mean temperature was 77.2°, or 1.1° below normal; the highest was 99°, at Huntington on the 2d, and the lowest, 46°, at De Funiak Springs on the 21st. The average precipitation was 10.71, or 3.00 above normal; the greatest monthly amount, 23.01, occurred at Sebastian, and the least, 1.94, at De Funiak Springs.—*A. J. Mitchell.*

Georgia.—The mean temperature was 73.8°, or 1.3° above normal; the highest was 101°, at Washington on the 15th, and the lowest, 37°, at Cedartown on the 24th. The average precipitation was 2.83, or 1.31 below normal; the greatest monthly amount, 11.94, occurred at Brunswick; no rain fell at Canton, Gillsville, Rome, and Griffin.—*J. B. Marbury.*

Idaho.—The mean temperature was 57.8°; the highest was 95°, at Payette on the 21st, and the lowest, 17°, at Swan Valley on the 9th. The average precipitation was 1.10; the greatest monthly amount, 2.85, oc-

curred at Fort Sherman, and the least, trace, at Rexburg.—*D. P. McCallum.*

Illinois.—The mean temperature was 71.3°, or 5.6° above normal; the highest was 103°, at Alexander on the 11th and 12th, and at Walnut on the 13th; the lowest was 27°, at Philo on the 21st. The average precipitation was 1.02, or 2.03 below normal; the greatest monthly amount, 3.43, occurred at Walnut, and the least, trace, at Carlinville and Hillsboro.—*C. E. Linney.*

Indiana.—The mean temperature was 69.8°, or 2.8° above normal; the highest was 103°, at Vincennes on the 13th, and the lowest, 24°, at Markle on the 20th. The average precipitation was 0.59, or 2.45 below normal, the greatest monthly amount, 1.86, occurred at Cambridge City, and the least, trace, at Valparaiso and Vevay.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 70.9°, or 8.7° above normal; the highest was 106°, at Malvern on the 2d and 3d, and the lowest, 26°, at Britt on the 20th. The average precipitation was 2.04, or 1.40 below normal; the greatest monthly amount, 5.88, occurred at Grand Meadow; no rain fell at Lemars.—*G. M. Chappel.*

Kansas.—The mean temperature was 74.0°, or 4.9° above normal; the highest was 105°, at Girard and Oswego on the 5th, and the lowest, 36°, at Seneca on the 20th. The average precipitation was 1.35, or 0.73 below normal; the greatest monthly amount, 3.42, occurred at Gove, and the least, 0.05, at Oswego.—*T. B. Jennings.*

Kentucky.—The mean temperature was 72.8°, or 3.4° above normal; the highest was 105°, at Greensburg on the 14th and at Shelby City on the 15th, and the lowest, 31°, at Loretto and Pleasure Ridge Park on the 21st. The average precipitation was 0.21, or 2.73 below normal; the greatest monthly amount, 1.20, occurred at Scott; no rain fell at Paducah and Shelby City. The month was the driest September on record.—*Frank Burke.*

Louisiana.—The mean temperature was 77.2°, or 0.6° above normal; the highest was 102°, at Liberty Hill on the 4th, and the lowest, 36°, at Robeline on the 21st. The average precipitation was 2.17, or 0.70 below normal; the greatest monthly amount, 8.60, occurred at Port Eads, and the least, trace, at Como and Oakridge.—*R. E. Kerkum.*

Maryland.—The mean temperature was 66.8°, or 0.4° below normal; the highest was 100°, at Taneytown on the 11th, and the lowest, 22°, at Deerpark on the 21st. The average precipitation was 1.88, or 1.72 below normal; the greatest monthly amount, 3.37, occurred at Sunnyside, and the least, 0.50, at Solomons.—*F. J. Walz.*

Michigan.—The mean temperature was 63.3°, or 3.4° above normal; the highest was 100°, at Mottville on the 9th, and the lowest, 20°, at Iron River on the 20th. The average precipitation was 1.30, or 1.54 below normal; the greatest monthly amount, 3.62, occurred at Sidnaw, and the least, 0.10, at Highland Station and Howell. The month was the driest September on record.—*C. F. Schneider.*

Minnesota.—The mean temperature was 65.2°, or 5.6° above normal; the highest was 99°, at Milan on the 7th, and the lowest, 18°, at Tower on the 20th. The average precipitation was 1.80, or 0.53 below normal; the greatest monthly amount, 6.50, occurred at Bonniwell, and the least, 0.20, at Koochiching.—*T. S. Outram.*

Mississippi.—The mean temperature was 76.9°, or 2.5° above normal; the highest was 100°, at University on the 16th, and the lowest, 36°, at French Camps on the 22d. The average precipitation was 0.65, or 3.16 below normal; the greatest monthly amount, 4.09, occurred at Biloxi. No rain fell over a considerable area in the northern portion of the State.—*R. J. Hyatt.*

Missouri.—The mean temperature was 74.2°, or 6.4° above normal; the highest was 105°, at Humansville and Mount Vernon on the 3d and at Elmira on the 4th; the lowest was 27°, at Potosi on the 21st. The average precipitation was 0.70, or 2.62 below normal; the greatest monthly amount, 2.70, occurred at Elmira; no rain fell at New Madrid. The month was remarkably dry and the warmest September for many years.—*A. B. Hackett.*

Nebraska.—The mean temperature was 70.6°, or 7.0° above normal; the highest was 113°, at Franklin on the 7th, and the lowest, 29°, at Kimball on the 16th. It was the warmest September during the past twenty-two years. The average precipitation was 1.26, or 0.58 below normal; the greatest monthly amount, 4.88, occurred at Arapahoe, and the least, trace, at Burwell and Fort Robinson.—*G. A. Loveland.*

New England.—The mean temperature was 59.4°, or 0.3° below normal; the highest was 98°, at Cumberland Mills, Me., on the 10th, and the lowest, 25°, at Grafton, N. H., on the 22d. The average precipitation was 2.19, or 1.07 below normal; the greatest monthly amount, 3.95, occurred at Block Island, R. I., and the least, 0.80, at Vineyard Haven, Mass.—*J. W. Smith.*

New Jersey.—The mean temperature was 65.5°, or 0.5° below normal; the highest was 99°, at Barnegat on the 11th, and the lowest, 30°, at Rivervale on the 28th. The average precipitation was 1.65, or 2.27 below normal; the greatest monthly amount, 3.97, occurred at Blairstown, and the least, 0.21, at Port Norris.—*E. W. McGann.*

New Mexico.—The mean temperature was slightly above normal; the highest was 95°, at Olio on the 1st, and the lowest, 26°, at Buckmans on the 28th. The average precipitation was slightly above normal; the greatest monthly amount, 5.38, occurred at Hillsboro, and the least, 0.11, at Raton.—*H. B. Hersey.*

New York.—The mean temperature was 60.9°, or 0.2° below normal; the highest was 97°, at Wedgewood on the 16th, and the lowest, 23°, at Franklinville on the 28th. The average precipitation was 1.92, or 1.39 below normal; the greatest monthly amount, 4.72, occurred at Ithaca, and the least, 0.29, at Lyndonville.—*R. M. Hurdings.*

North Carolina.—The mean temperature was 70.7°, or 0.5° above normal; the highest was 101°, at Chapel Hill and Tarboro on the 14th, and the lowest, 28°, at Linville on the 30th. The average precipitation was 1.47, or 3.07 below normal; the greatest monthly amount, 6.14, occurred at Southport, and the least, 0.19, at Waynesville.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 64.1°, or 7.4° above normal; the highest was 109°, at Whites Ranch on the 3d, and the lowest, 18°, at Gallatin on the 19th. The average precipitation was 0.28, or 0.87 below normal; the greatest monthly amount, 0.92, occurred at Whites Ranch; no rain fell at Grafton and Jamestown, and but a trace at Ellendale, Gallatin, Larimore, McKinney, Milton, and Sheyenne.—*B. H. Bronson.*

Ohio.—The mean temperature was 66.9°, or 2.1° above normal; the highest was 105°, at Logan on the 14th and 15th and at Jacksonboro on the 15th; the lowest was 25°, at Greenhill on the 28th. The average precipitation was 0.78, or 2.07 below normal; the greatest monthly amount, 2.04, occurred at Atwater, and the least, trace, at Greenfield. The month was remarkable as regards the great extremes of temperature both daily and for the month, the great number of absolutely clear and dry days, and the general and decided deficiency in total amount of moisture received.—*H. W. Richardson.*

Oklahoma.—The mean temperature was 74.9°; the highest was 108°, at Lehigh on the 4th, and the lowest, 36°, at Lehigh on the 22d. The average precipitation was 1.86; the greatest monthly amount, 8.10, occurred at Hennessey; no rain fell at Tulsa.—*J. I. Widmeyer.*

Oregon.—The mean temperature was 57.4°, or 1.0° below normal; the highest was 96°, at Grants Pass on the 25th, and the lowest, 20°, at Burns on the 30th. The average precipitation was 1.87, or 0.11 below normal; the greatest monthly amount, 5.41, occurred at Bay City, and the least, 0.14, at Riverside.—*B. S. Pague.*

Pennsylvania.—The mean temperature was 63.8°, or 1.0° above normal; the highest was 100°, at Hollidaysburg on the 16th, and the lowest, 24°, at Franklin on the 21st. The average precipitation was 2.18, or 1.39 below normal; the greatest monthly amount, 4.21, occurred at Lockhaven, and the least, 0.25, at Cannonsburg.—*T. F. Townsend.*

South Carolina.—The mean temperature was 73.3°, or 0.8° below normal; the highest was 100°, at Blackville, Central, and Columbia on the 15th, and the lowest, 42°, at Holland on the 30th, and at Walhalla on the 29th. The average precipitation was 2.91, or 2.03 below normal; the greatest monthly amount, 5.52, occurred at St. Matthews, and the least, 0.80, at Walhalla.—*J. W. Bauer.*

South Dakota.—The mean temperature was 68.9°, or 8.5° above normal; the highest was 107°, at Cherry Creek on the 7th, and the lowest, 25°, at Cross on the 16th, and at Castlewood, Goudyville, and Watertown on the 17th. The average precipitation was 1.09, or 0.23 below normal; the greatest monthly amount, 3.57, occurred at Howard; no rain fell at Farmingdale, Forest City, and Spearfish.—*S. W. Glenn.*

Tennessee.—The mean temperature was 72.3°, or 2.4° above normal; the highest was 104°, at Sylvia on the 11th, and the lowest, 30°, at Erasmus, Hohenwald, and Johnsonville on the 22d. The average precipitation was 0.55, or 2.45 below normal; the greatest monthly amount, 3.19, occurred at Newmarket, while at many stations in the western half of the State no rain fell.—*H. C. Bate.*

Texas.—The mean temperature for the State during the month was 0.4° below the normal. There was a general deficiency throughout the State, except over north and central Texas, the western portion of southwest Texas, and the northern portion of east Texas, where there was an excess ranging from 0.1° to 2.5°, with the greatest excess in the vicinity of Corsicana. The deficiency ranged from 0.3° to 3.2° over the panhandle, over west Texas, over the eastern portion of southwest Texas, and the southern portion of east Texas, and from 0.4° to 3.4° over the coast district, with the greatest deficiency in the vicinity of Fort Ringgold. The highest was 105°, at Texarkana on the 3d, and the lowest, 40°, at Kerrville on the 26th and at Texarkana on the 23d. The average precipitation for the State during the month was 1.18 below the normal. There was a general deficiency, except over the greater portion of central Texas, over the western portions of north and west Texas, and in the vicinity of Huntsville and Houston, where there was an excess ranging from 0.23 to 2.29, with the greatest in the vicinity of Burnet. The deficiency ranged from 0.03 to 2.58 over the panhandle and the eastern portions of north and west Texas, from 0.07 to 3.35 over east and southwest Texas, and from 0.48 to 4.62 over the coast district, with the greatest deficit in the vicinity of Corpus Christi. The greatest monthly amount, 5.25, occurred at Conroe, and the least, 0.10, at Point Isabel.—*I. M. Cline.*

Utah.—The mean temperature was 62.2°; the highest was 100°, at Fillmore and St. George on the 1st, and the lowest, 25°, at Loa on the 13th. The average precipitation was 1.64; the greatest monthly amount, 4.61, occurred at Fort Du Chesne, and the least, 0.17, at Huntsville.—*J. H. Smith.*

Virginia.—The mean temperature was 68.8°, or 1.0° above normal; the highest was 102°, at Nottoway on the 10th, and the lowest, 26°, at Goshen on the 22d. The average precipitation was 1.01, or 3.46 below normal; the greatest monthly amount, 2.56, occurred at Salem, and the least, trace, at Farmville.—*E. A. Evans.*

Washington.—The mean temperature was 56.9°, or 0.3° below normal; the highest was 97°, at Centerville on the 21st, and the lowest, 24°, at Wenatchee Lake on the 28th. The average precipitation was 1.79, or 0.22 below normal; the greatest monthly amount, 7.90, occurred at Snohomish, and the least, 0.11, at Lakeside.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 66.4°, or slightly above normal; the highest was 103°, at Hewett on the 15th and 16th, and the lowest, 27°, at White Sulphur Springs on the 17th. The average precipitation was 1.14, or greatly below normal; the greatest monthly

amount, 4.00, occurred at Philippi, and the least, 0.02, at Green Sulphur Springs.—*H. L. Ball.*

Wisconsin.—The mean temperature was 65.5°, or 4.5° above normal; the highest was 97°, at Chilton, Sharon, and Whitemound on the 8th and at Delavan on the 10th, and the lowest, 22°, at Antigo and Barron on the 20th. The average precipitation was 2.28, or 0.78 below normal; the greatest monthly amount, 6.58, occurred at Prairie du Chien, and the least, 0.72, at Port Washington.—*W. M. Wilson.*

Wyoming.—The mean temperature was 61.1°, or 4.0° above normal; the highest was 99°, at Carbon on the 2d and at Fort Laramie on the 8th, and the lowest, 21°, at Fort Washakie on the 18th. The average precipitation was 0.38, or 0.67 below normal; the greatest monthly amount, 1.14, occurred at Fort Laramie, and the least, trace, at Wheatland.—*M. G. Renoe.*

RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

The rivers have continued falling slowly and are now at about their annual ebb. As a rule, they are below their normal of lowest stage. Navigation is practically suspended except on the Mississippi below Cairo.

The highest and lowest water, mean stage, and monthly range at 113 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicksburg, on the Mississippi; Cincinnati, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

The following résumé of river stages and conditions of navigation in the respective streams is compiled from reports by the officials of the Weather Bureau at various river stations and section centers:

Atlantic Coast Rivers. (Reported by A. F. Sims, Albany, N. Y.; E. R. Demain, Harrisburg, Pa.; E. A. Evans, Richmond, Va.; C. F. von Herrmann, Raleigh, N. C.; L. N. Jesunofsky, Charleston, S. C.; D. Fisher, Augusta, Ga.; and J. B. Marbury, Atlanta, Ga.)—During the first decade of September an abnormally low stage of water was maintained in the Hudson River. The water reached the lowest point for the season on the 7th. Usually the water is lowest in the months of July and August. The water has been so low that the steamer *Saratoga* of the Citizens' Line brought up mud on her huge paddles at every revolution. Light fog prevailed in the Hudson Valley on the 9th, and a dense fog on the 6th, and during the early morning hours on the 22d.

About the usual stages of water for the time of year obtained in the Susquehanna River and its tributaries. The average gauge readings of 14 reporting stations was 0.6 foot, the same as in 1896, although the average rainfall for 17 stations was only about 70 per cent of the amount registered during September, 1896. In the lower river, while low stages prevailed, the water did not fall so low as in last September. The average for the month at Harrisburg was 0.5 foot higher than during the corresponding period in 1896. Drought prevailed during the first half of the month and all streams fell slowly, but showers occurred in the basin from the 16th to the 22d and a general rain fell on the 23d and 24th, causing a rise of from 1 to 2 feet at most reporting stations, and the month closed with higher stages than ruled at the beginning of the month.

On the West Branch, at Sinnamahoning and Cedar Run, the water was below zero of the gauge during the entire month; at Cameron it ranged from -0.2 to 0.2; at Renovo the range was from zero to -0.5 from the 1st to the 24th, the river rising to a maximum of 2 feet on the 26th; at Lockhaven the water stood at zero from the 10th to the 19th, inclusive, and touched zero again on the 23d, the maximum reading for the month being 1 foot on the 26th; at other stations on the West Branch the gauge readings ranged from zero to 2.8 feet above. On the North Branch, at Wilkesbarre, the gauge readings ranged from zero to 1 foot below, and at East Bloomsburg a zero stage was maintained from the 1st to the 23d, when the river began to rise, the highest point touched being 2.5 feet on the 26th and 27th. The Juniata kept up well notwithstanding the deficiency in rainfall, the gauge readings ranging from 1.5 to 3.8 feet.

An unusually low stage of water prevailed in the James River, from the head of tidewater to its source, during the entire month. The month was largely deficient in rainfall, none of any consequence being reported, except about the 1st and 21st to 23d, when fairly good showers fell over the river basin. The proportion of this downfall

which drained to the river was very small, owing to the dry condition of the ground, and hence but a slight passing change in the stage of the water occurred.

At Richmond the falls of the James present an unusual sight, the river bed being entirely uncovered in some places, and rocks never known before to be above the surface, are now high and dry. The water is the lowest on record at this point, and from reliable sources it is learned that it is lower than for many years, if not the lowest observed. The officials of the Chesapeake and Ohio Railway Company, which has maintained a system of gauges on the James River division of their line, state that the present stage of water is the lowest of which they have any record. This same state of affairs obtains in all the large streams in this portion of the State. The Rappahannock River is so low that the mills have been obliged to shut down, and on the line of the Richmond and Danville Railroad water has to be hauled from Richmond in tank cars to various points for use of the engines. Small creeks and branches, which are reported to have always furnished water heretofore, are now dry. The question of water is becoming a serious one for the agricultural communities of this section.

The month of September was characterized by the most severe drought in the history of North Carolina. The small amounts of precipitation occurring between the 17th and 23d were altogether insufficient to appreciably influence the stages of the rivers. The latter remained exceptionally low the entire month. During the second decade the lowest stages ever recorded were noted on the Cape Fear and Roanoke. On the Dan, at Clarksville, the river was 0.4 foot below the zero of the gauge from the 13th to the 17th, and at Fayetteville the Cape Fear diminished to 0.3 foot on the 17th. Many of the small streams in the upper country have become quite dry; wells are very low and many dry; stock has to be watered; navigation, except near the mouths of the Roanoke and Cape Fear, has been completely interrupted.

The freshet on the lower Edisto, at Jacksonboro, on September 27, continued to the 4th of October, when the water had receded sufficiently for the proper drainage of the rice lands. Much of the rice was overripe when the flood waters arrived, but by rapid harvesting, immediately after the freshet subsided, considerable was saved. The damage caused by the freshet was not so great as at first anticipated. A few of the rice planters escaped the high water entirely, as their crops were gathered two days before the rise occurred.

The general and heavy precipitation on the 21st and 22d affected the streams but slightly; other than this but little rainfall occurred over the drainage areas of the upper sections of the streams. The Great Pedee, from its mouth at Winyah Bay to Cheraw, was scarcely navigable during any day in the month. At Smiths Mills the gauge registered -1.6 foot on the 16th, 17th, and 18th, which was below the low water reading of October 22, 1895 (-0.4 foot). The latter was recorded at that time as being the lowest stage reached in thirty-eight years. Old river men connected with the steamboat interests for the past forty years state that they have never known the Great Pedee to become unnavigable for one entire month. This condition of affairs is rather unfortunate for the steamboat lines, as much cotton, rice, tar, rosin, turpentine, and other articles of merchandise, is awaiting transportation up and down these streams. There was also an unusual lack of steamboat water in the Little Pedee and Lumber rivers, navigation thereon having been impeded the entire month. The Waccamaw was at a fairly good stage up to Conway throughout the entire month, the traffic occasioned thereby having been quite brisk.

The Savannah fell to such a low stage during the first and second decades of the month that, for the greater portion of this period, navigation was wholly interrupted, several attempts having been made to run cargoes down the river, but even with the lightest of loads nothing was accomplished. The only rainfall worthy of note during September was that which occurred on the 22d and 23d, and though the fall was excessive over the central and lower portion of the Savannah